

CLAIM OR CLAIMS

What is claimed is:

1. A unitary lens filter for a responsive display device with associated process control equipment having an internal screen adapted to display process information to facilitate operator control of the process and a sensor adapted to receive operator control input, said lens filter comprising:

a front cover anchoring said lens filter to the process control equipment, said front cover defining a central port through which said display device may be observed by the operator;

a substantially transparent rear lens filter housed in said central port, said rear lens filter permitting an operator to view process control information shown on said display device;

a bezel integral with said rear lens for securing said rear lens to said front cover, said bezel having a periphery extending substantially beyond the periphery of said rear lens and wherein said bezel is formed simultaneously with the formation of said rear lens, and both are formed by molding or forming to form a shield impenetrable by high pressure liquids to thereby protect said display device; and,

an integral reinforcing lens permitting said sensor to receive operator input therethrough and securing said rear lens periphery to said bezel to stabilize said lens and thereby substantially dissipate any external force including repetitive operator contact to prevent interruption of operator input when the force is inadvertently applied to said rear lens.

2. The unitary lens filter as recited in claim 1 wherein said integral bezel includes a peripheral edge surrounding and captivating the sensor and dissipating forces transferred thereto by said bezel.

3. The unitary lens filter as recited in claim 2 further including an internal lens retainer adapted to captivate said bezel compressibly against said front cover to secure said lens filter to the equipment.

4. The unitary lens filter as recited in claim 3 wherein said sensor comprises an infrared touch input device having opposing banks of emitters and receivers.

- 1 5. The unitary lens filter as recited in claim 3 wherein said sensor comprises an acoustic
2 input device having opposing banks of emitters and receivers.
- 3 6. The unitary lens filter as recited in claim 3 wherein said sensor comprises an optical input
4 device having opposing banks of emitters and receivers.
- 5 7. The unitary lens filter as recited in claim 3 wherein said display comprises a liquid crystal
6 display device or a cathode ray tube display device.
- 7 8. An integral display lens filter for an associated process machine adapted to display
8 process information reviewable by an operator, said lens comprising:
9 a front cover captivating a bezel against an internal lens retainer for securing an integral and
10 substantially transparent rear lens filter and lens to the machine in an operative configuration to
11 display process information through said lens filter and receive operator input through said lens, so
12 said lens filter and said lens are held in place relative to the machine and wherein said bezel forms a
13 mechanical lock to the machine that provides a liquid tight seal;
14 an integral reinforcing edge formed about the periphery of the bezel for diffusing a touch
15 force when the touch force is applied to said lens or said rear lens filter;
16 wherein said reinforcing edge, said bezel, said lens and said internal lens retainer form a
17 housing adapted to protectively captivate a plurality of opposing emitters and receivers disposed
18 around the periphery of said lens, said emitter and receivers forming a grid over said rear lens;
19 a display disposed behind and adjacent to said lens and adapted to display process
20 information behind said grid; and
21 a controller adapted to interpret interruptions in said grid and providing input coordinates
22 for said interruption;
23 wherein said front cover is secured to the machine to captivate said lens against the machine
24 to protect said display.
- 25 9. The integral display lens filter recited in claim 8 wherein said bezel may be compressibly
26 secured between said cover and said internal retainer to compensate for different rates of expansion

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1 and contraction of said cover and said rear lens while maintaining the mechanical lock and liquid
2 seal and wherein said bezel is a unitary member with said lens and said rear lens filter.

3 10. The integral display lens filter recited in claim 9 wherein said emitters and receivers
4 comprise infrared emitters and receivers.

5 11. The integral display lens filter recited in claim 9 wherein said emitters and receivers
6 comprise acoustic emitters and receivers.

7 12. The integral display lens filter recited in claim 9 wherein said emitters and receivers
8 comprise optical emitters and receivers.

9 13. The integral display lens filter recited in claim 9 wherein said display comprises a liquid
10 crystal display device or a cathode ray tube display device.

11 14. A computer system display adapted to show process information and receive operator
12 input, said system comprising:

13 a system unit in a substantially rigid housing with a central access port, said system unit
14 comprising an internal display means for displaying process information in said access port and

15 sensor means for receiving operator input adjacent said display means; and,

16 an exterior lens assembly covering said access port and having a bezel with inner edges
17 describing a lens circumscribing said access port, said bezel made of a polycarbonate material, and

18 an inwardly placed rear lens filter that covers said access port yet permits the displaying of process
19 information therethrough and wherein said lens assembly is adapted to completely prevent liquid

20 entry through said access port, said lens assembly captivated to said housing to provide a liquid
21 tight seal to protect said touch sensor.

22 15. The computer system recited in claim 14 further comprising a front cover captivating
23 said bezel against an internal lens retainer for securing said lens assembly to said housing in an
24 operative configuration to display process information through said lens filter and receive operator
25 input through said lens, so said lens filter and said lens are held in place relative to said housing ar
26 wherein said bezel provides a liquid tight seal.

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16. The computer system recited in claim 15 wherein said sensor means comprises an infrared touch input device having opposing banks of emitters and receivers.

17. The computer system recited in claim 15 wherein said sensor means comprises an acoustic input device having opposing banks of emitters and receivers.

18. The computer system recited in claim 15 wherein said sensor means comprises an optical input device having opposing banks of emitters and receivers.

19. The computer system recited in claim 15 wherein said display means comprises a liquid crystal display device or a cathode ray tube display device.